50-2652.05

STATE OF CALIFORNIA - CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY PETE WILSON, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
N DIEGO REGION
CLAIREMONT MESA BOULEVARD, SUITE B
SAN DIEGO, CA 92124-1331
TELEPHONE: (619) 467-2952
FAX: (619) 571-6972

CERTIFIED MAIL - RETURN RECEIPT REQUESTED
Z 416 683 865

March 16, 1995

Brigadier General Claude Reinke
Commanding General
Building 1106, Marine Corps Base
Camp Pendleton, CA 92055-5010

Dear Sir:

RE: ISSUANCE OF REGIONAL WATER QUALITY CONTROL BOARD (RWQCB) CLEANUP AND ABATEMENT ORDER NO. 95-09 FOR THE DISCHARGE OF PETROLEUM FUELS TO SOILS AND GROUND WATER AT THE MARINE CORPS BASE (MCB) CAMP PENDLETON.

Enclosed is a copy of Cleanup and Abatement (C&A) Order No. 95-09 concerning environmental contamination at the U.S. Marine Corps Air Station Fuel Farm, 23 Area, U.S. Marine Corps Base, Camp Pendleton, California. This cleanup and abatement order is issued to the U.S. Marine Corps under the authority of the California Water Code, Section 13304 in response to the presence of fuel hydrocarbon contamination in the soil and ground water beneath the Fuel Farm at the Marine Corps Air Station in 23 Area. The soil and ground water contamination at the MCAS Fuel Farm is also located in proximity to at least three base water supply wells known to be located at the MCAS facility.

The enclosed C&A Order directs the U.S. Marine Corps to clean up the soil and ground water contamination in compliance with all relevant state regulations, policies and procedures of the State Water Resources Control Board (SWRCB). The C&A Order directs the U.S. Marine Corps to provide the RWQCB Executive Officer with regularly scheduled ground water monitoring reports, site investigation reports and a corrective action plan (CAP).

I strongly urge a prompt and complete response to each directive of C&A Order 95-09. Since this contaminated site is located in proximity to operating base water supply wells, we anticipate an aggressive attempt by the U.S. Marine Corps to comply with the directives and the schedule required by the C&A Order. My staff will be happy to work with you in your efforts toward achieving compliance with the directives of the enclosed C&A Order.

Attached, please find Tables 1 and 2 which set out in tabular form the schedule of compliance for directives and deliverables found in C&A Order No. 95-09. If you have any questions, please contact John Odermatt of my staff at (619) 637-5595.

Very truly yours,

ARTHUR L. COE
Executive Officer

ALC:jpa:jro \CPENUST\MCASCAO.COV

cc: Mr. Lupe Armas, Office of the Assistant Chief of Staff Environmental Security, Building 22-165, Marine Corps Base, P.O. Box 555008, Camp Pendleton, CA 92055-55008

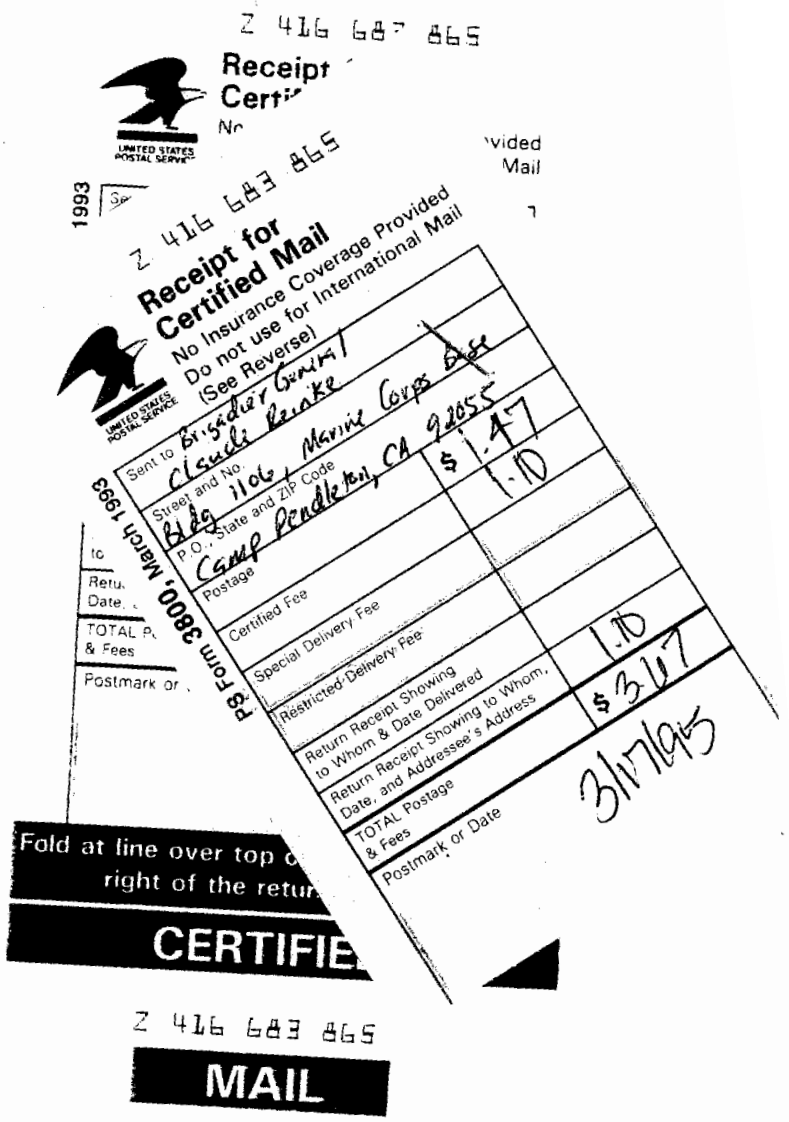
Ms. Jayne Joy, Office of the Assistant Chief of Staff, Environmental Security, Marine Corps Base Building 22-165, P.O. Box 555008, Camp Pendleton, CA 92055-5008

Ms. Sheryl Lauth, U.S. Environmental Protection Agency (Code H-9-2), 75 Hawthorne Street, San Francisco, CA 94105

Mr. Isaac Hirbawi, Department of Toxic Substances Control Region 4, 245 West Broadway, Suite 350, Long Beach, CA 90802-4444

Mr. Lars Skinner, San Diego County Department of Environmental Health, P.O. Box 85261 M.S. D-561, San Diego, CA 92186

FILE: 166-75 (USMC Camp Pendleton - MCAS Fuel Farm, Cleanup and Abatement Order No. 95-09)



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Commanding General
Building 1106, Marine Corps Base
Camp Pendleton, CA 92055-5010

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U.S. MARINE CORPS AIR STATION (MUNN FIELD, 23 AREA), FUEL FARM
U.S. MARINE CORPS BASE, CAMP PENDLETON

TABLE 1: SCHEDULE OF COMPLIANCE FOR DIRECTIVES IN RWQCB CLEANUP AND ABATEMENT ORDER No. 95-09

C&A DIRECTIVE	SUBMITTAL	DUE DATE
1	Propose wells for quarterly ground water monitoring network to RWQCB E.O.	May 30, 1995
11	Work plan for interim remedial action	October 31, 1995
14	Workplan for site investigation	January 30, 1996
14	Site Investigation Report	August 30, 1996
15	Work plan for capture zone analysis	April 20, 1996
16	Capture zone analysis report	October 10, 1996
19 - 23	Corrective Action Plan	January 30, 1997
24	Work plan for Verification sampling and monitoring program	4 months after completion of Corrective Action Plan implementation.
1	Quarterly Ground Water Monitoring Reports	First report due July 31, 1995 then continue on a quarterly schedule (see Table 2) for minimum of 3 years.

TABLE 2: GROUND WATER MONITORING/REPORTING SCHEDULE

REPORT	REPORT PERIOD	DUE DATE
QUARTERLY	January through March April through June July through September October through December	April 30 July 31 October 30 January 30
ANNUAL	January - December	January 30

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

CLEANUP AND ABATEMENT ORDER NO. 95-09

U.S. MARINE CORPS AIR STATION FUEL FARM,
23 AREA, U.S. MARINE CORPS BASE
CAMP PENDLETON, CALIFORNIA
SAN DIEGO COUNTY

The California Regional Water Quality Control Board, San Diego Region (hereinafter RWQCB) finds that:

1. The U.S. Marine Corps Base at Camp Pendleton was established in 1942. As part of its military mission, the U.S. Marine Corps owned and operated an Air Station facility (Munn Field) with supporting fuel storage and distribution facilities. The fuel farm facility is located in the 23 Area of the U.S. Marine Corps Base (MCB) at Camp Pendleton and has been in operation since December 1987.

2. MCB Camp Pendleton is a ground water dependent community. The base derives all of its water supplies from on base ground water production wells. In 1992, MCB Camp Pendleton produced approximately 10,000 acre-feet of water from a total of 26 base water supply wells located in the four ground water basins at the base. The Santa Margarita watershed, including the U.S. Marine Corps Air Station (MCAS) in 23 Area, contains 13 of the existing base water supply wells .

3. During late July 1993, Law-Crandall Inc. installed 31 hand auger borings at the site. Subsequently, 25 of these locations were converted into piezometers on July 30, 1993.

4. In late July 1993, the Environmental and Natural Resources Management Office (ENRMO) staff at Camp Pendleton verbally reported the discovery of free petroleum product (jet fuel) observed on the ground water at the MCAS fuel farm facility to the County of San Diego, Environmental Health Services (EHS). EHS staff were informed that an unauthorized release of petroleum hydrocarbons which resulted in the presence of non-aqueous phase liquid (NAPL) petroleum hydrocarbons being observed on ground water near the underground storage tanks designated as #23102-1 and #23102-2 located at the MCAS fueling facility.

5. On July 30, 1993, RWQCB staff and EHS were notified by the Environmental and Natural Resources Management Office (currently the Office of the Assistant Chief of Staff, Environmental Security) that non-aqueous phase liquid (NAPL) petroleum product (jet fuel, JP-5) was reportedly observed on the ground water table in the following wells at the site:

Piezometer	Inches of NAPL
B-1	0.05 to 1.5
B-9	0.12 to 0.37
B-13	0.12 to 0.75
B-14	6 to 24
B-15	0.12 to 0.5
B-16	0.06 to 0.5
B-19	0.06 to 0.5
B-21	0.06 to 2.5
B-23	0.06
B-24	0.5 to 1.5
B-26	4 inch interface to 0.25

6. On August 9, 1993, the San Diego County EHS issued a notice to MCB Camp Pendleton naming the base Commanding General and the Director of the Environmental and Natural Resources Management Office (ENRMO) as co-responsible parties (RP). The notice informed the responsible parties of their obligation to investigate and remediate the unauthorized release under the requirements of the California Code of Regulations and the California Health and Safety Code.

7. On August 25, 1993, a meeting was held between San Diego County EHS staff, Camp Pendleton ENRMO and the Facilities Maintenance Office (FMO) staff to discuss the possible impacts of the release at the MCAS upon base water supply wells located at the air station facility. San Diego County EHS staff requested that ENRMO provide well construction diagrams for the existing base water supply wells located at the MCAS facility. The consensus of the attendees at the meeting was to locate sets of shallow and deep early warning wells between the fuel area release site and the existing base water supply wells located at the MCAS Facility.

8. On September 7, 1993, ENRMO staff provided well construction diagrams for three base water supply wells identified as #2393, #2363 and #2373 and located at the MCAS (Munn Field) Facility in 23 Area. According to IT Corporation (Report dated February 1994), these three wells have provided up to 30% of the water supply consumed at MCB Camp Pendleton. The wells are

designed (screened) to pump from the deep aquifer beneath the MCAS. Construction diagrams for three base water supply wells were provided by ENRMO for the following wells:

WELL	SCREENED INTERVAL	CONSTRUCTION DATE
#2393	74 to 109 ft	May 1965
#2363	68 to 132 ft	July 1956
#2373	108 to 176 ft	June 1960

According to discussions with ENRMO staff and the available construction diagrams, the three wells identified in this finding were designed and installed without a subsurface seal. These wells reportedly also include a system to replenish the gravel pack from the surface. This well design may allow shallow ground water to be in direct contact with gravel pack materials and provide a potential contaminant migration pathway for contaminants in the shallow aquifer to access the deep aquifer, domestic water supply used by MCB Camp Pendleton.

9. On October 6, 1993, IT Corporation permitted a total of six ground water monitoring wells to be located near the existing base water supply wells listed in Finding Number 8. These six ground water monitoring wells were located and constructed to serve as "*early warning wells*" for each of the associated base water supply wells located at the USMC Air Station and identified in Finding Number 8 above. The early warning wells were installed under permit with San Diego County EHS, developed, purged and reportedly sampled according to the guidelines of the San Diego County Site Assessment and Mitigation (SAM) Manual. The early warning wells were located to monitor ground water quality near the following base water supply (production) wells:

PRODUCTION WELL	EARLY WARNING WELL(S)
#2363	*SHALLOW:* FL-01, FL-02 *DEEP*: FL-05
#2373	*SHALLOW:* FL-03, FL-04 *DEEP*: FL-06
#2393	*SHALLOW:* FL-07

Early warning wells were constructed as *"shallow"* (screened interval from 5.5 to 15.5 ft below grade) and *"deep"* (screened interval from 137 to 150 ft below grade) and located between 120 and 1,120 feet from the respective production wells listed above.

10. On October 20, 1993, ENRMO submitted a letter report to RWQCB staff. The ENRMO report estimated that approximately 512 gallons of free petroleum product were present near the underground storage tanks (USTs) at the fuel farm facility.

11. On March 29, 1994 a report, prepared by IT Corporation and dated February 7, 1994, of ground water sample results of the early warning wells was submitted by ENRMO to San Diego County EHS. The report indicates traces of dissolved volatile aromatic hydrocarbons were detected in some of the of ground water samples collected by IT Corporation:

---------- (Units in ug/L) ----------

WELL	DATE	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES
FL-02	11/29/93	<0.5	0.34	<0.5	<0.5
FL-05	11/29/93	<0.5	0.79	<0.5	1.1
FL-06*	11/17/93	<0.5	0.49	<0.5	0.55
FL-06	11/29/93	<0.5	0.53	<0.5	0.55

The report prepared by IT Corporation indicates that the "equipment blank" for the ground water samples collected on 11/17/93 (*) contained traces (ug/L levels) of volatile aromatic hydrocarbons. The contamination of the trip blank sample makes it very difficult to use the data collected on 11/17/93 to determine if the deep ground water aquifer has been contaminated by volatile aromatic hydrocarbons. Subsequent analyses of ground water samples collected on 11/29/93 from the wells suggest that shallow and deep ground water aquifers contain low levels (<1 ug/L) of toluene and xylene at these well locations.

12. The *Comprehensive Water Quality Control Plan Report, San Diego Region (9)* (Basin Plan) was adopted by the RWQCB on March 17, 1975; approved by the State Water Resources Control Board (SWRCB) on March 20, 1975; with subsequent updates by the RWQCB which were also approved by the SWRCB. The Basin Plan establishes water quality objectives for the San Diego Basin.

13. The MCAS Facility is located within an area of the Santa Margarita River Basin watershed designated by the Basin Plan as the Ysidora Hydrographic Subunit (2.10). The following designated beneficial uses have been established for surface water resources of the Ysidora Hydrographic Subunit (2.10) by the

Basin Plan:

a) Municipal and domestic supply (MUN).
b) Agricultural Supply (AGR).
c) Industrial Service Supply (IND).
d) Industrial Process Supply (PROC).
e) Water contact recreation (REC1).
f) Non-contact water recreation (REC2).
g) Warm freshwater habitat (WARM).
h) Cold freshwater habitat (COLD).
i) Wildlife habitat (WILD).
j) Preservation of rare and endangered species (RARE).

14. The following designated beneficial uses have been established by the Basin Plan for ground water resources of the Ysidora Hydrographic Subunit (2.10):

a) Municipal and domestic supply (MUN).
b) Agricultural Supply (AGR).
c) Industrial Service Supply (IND).
d) Ground water recharge (GW).

15. The RWQCB Basin Plan contains the following objectives which applies to all ground waters in the San Diego Region:

> "Ground water shall not contain taste or odor producing substances in concentrations that cause nuisance or adversely affect beneficial uses."

16. The discharge of petroleum fuel hydrocarbons has created a condition of pollution, as defined in the California Water Code Section 13050, in the ground water based upon the following standards:

a) The following maximum contaminant levels (MCLs) for benzene, ethylbenzene, xylene, and total lead are established for primary drinking water constituents in California Code of Regulations (CCR), Title 22, Division 4, Chapter 15, Article 5.5, Section 64444:

Constituent	Maximum Contaminant Level
Benzene	1 ug/L
Total Lead	50 ug/L
Toluene	150 ug/L
Ethylbenzene	680 ug/L
Xylene	1,750 ug/L

b) The U.S. Environmental Protection Agency (U.S. EPA) has evaluated the literature for taste and odor detection levels for benzene, toluene, ethylbenzene and xylene. The findings in the literature evaluation is summarized in Federal Register, Volume 54, Number 97, pages 22138-22139. U.S. EPA has proposed that the following secondary maximum contaminant levels (MCLs) be established based upon taste and odor detection levels:

Constituent	Secondary MCL (proposed)	
Xylene(s)	17	ug/L
Ethylbenzene	29	ug/L
Toluene	42	ug/L

17. Non-aqueous phase liquid (NAPL) petroleum product has been detected on the water table at the MCAS fueling facility. The presence of petroleum product containing benzene, toluene, ethylbenzene and xylene has caused or threatens to cause the applicable MCLs in the underlying ground water to be exceeded.

18. The location of the unauthorized release from the MCAS fuel farm is in proximity to at least three existing base water supply wells identified in Finding Number 8 of this Order.

19. Pursuant to State Water Resources Control Resolution No. 68-16 the RWQCB is required to ensure that dischargers are required to clean up and abate the effects of discharges in a manner that promotes the attainment of background water quality, or the highest water quality which is reasonable if background levels can not be restored, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social tangible and intangible; any alternative levels less stringent than background shall:

a) be consistent with the maximum benefit to the people of the state;

b) not unreasonably affect the present and anticipated beneficial use of such water; and

c) not result in water quality less than that prescribed in the Water Quality Control Plans and Policies adopted by the State and Regional Water Boards.

20. State Water Resources Control Board (SWRCB) regulations governing waste discharges to land (CCR, Title 23, Division 3, Chapter 15) require that cleanup and abatement actions intended to contain waste at the place of release shall implement the applicable provisions of that chapter, to the extent feasible (CCR,Title 23, Division 3, Chapter 15, Section 2511(d)). Article 5 of that chapter will be considered in establishing cleanup levels (CCR Title 23, Chapter 15, Section 2550.4) and undertaking corrective actions where discharges of waste are subject to Water Code Section 13304.

21. SWRCB regulations governing the site investigation and corrective action at underground storage tank unauthorized release sites are contained in CCR, Title 23, Division 3, Chapter 16. In particular, Article 11, commencing with Section 2720 is applicable to this cleanup and abatement order.

22. This enforcement action is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000 et seq.) in accordance with Section 15321, Chapter 3, Title 14, California Code of Regulations.

23. MCB Camp Pendleton is currently pursuing remedial actions at other contaminated sites under the Department of Defense Installation Restoration (I.R.) Program. The I.R. program commonly uses the provisions and requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA or "*Superfund*"). The provisions of CERCLA specifically exclude sites where petroleum fuels are the only contaminants of concern (Title 14, U.S.C., Section 9601(14)). According to the information available to RWQCB staff, the unauthorized release case at the MCAS fuel farm facility is not anticipated to be covered under the provisions of CERCLA.

IT IS HEREBY ORDERED, that pursuant to Section 13304 of the California Water Code, the U.S. Marine Corps (hereinafter the *"discharger"*) shall comply with the following:

GROUND WATER MONITORING

1. The discharger shall implement a quarterly ground water monitoring program at this site for a minimum period of **three consecutive years**. The RWQCB Executive Officer may require additional ground water monitoring and/or corrective action following the completion and evaluation of these data at the end of the third year. The ground water monitoring program must include at a minimum:

a) all wells designated/installed to serve as early warning wells (FL-01, FL-02, FL-03, FL-04, FL-05, FL-06 and FL-07) located near base water supply wells (#2363, #2373 and #2393) at the U.S. Marine Corps Air Station Facility at Camp Pendleton; and

b) ground water monitoring wells located at the perimeter of the fuel farm facility.

Specific ground water monitoring well locations at the perimeter of the MCAS Fuel Farm to be included in the ground water monitoring program shall be proposed by the discharger in writing to the RWQCB Executive Officer for review and approval. The proposed ground water monitoring program and a location map illustrating the location of the site and all wells included in the ground water monitoring program shall be submitted to the Executive Officer no later than **May 30, 1995**. The first quarterly ground water monitoring report shall be submitted to the RWQCB Executive Officer no later than **July 31, 1995.** The RWQCB Executive Officer will also consider proposals from the discharger for the inclusion of additional appropriately located existing ground water monitoring wells which may have been installed at the MCAS facility as a result of other environmental investigations (e.g., the Installation Restoration Program).

2. All new ground water monitoring wells shall be designed and certified as adequate pursuant to CCR Title 23, Chapter 15, Section 2555 by a registered geologist or a registered civil engineer in the State of California.

3. All monitoring wells shall be constructed in a manner that maintains the integrity of the bore hole and prevents cross-contamination of the saturated zones. The wells shall be constructed and maintained in accordance with the requirements of CCR Title 23, Chapter 16, Article 4; Department of Water Resources (DWR) Bulletins 74-81 and 74-90; and other requirements from the local permitting agency (San Diego County Environmental Health Services). All well logs shall be reported to the appropriate State (DWR) and local (San Diego County EHS) agencies. In case of a conflict between the well construction or maintenance requirements, the discharger shall adopt the most stringent of the requirements as its well construction standard.

4. Prior to sampling the monitoring wells, the discharger shall determine if a floating immiscible layer (non-aqueous phase liquid or NAPL) of free petroleum product exists in each well. If a NAPL layer is found in any of the early warning wells identified in Finding No. 8 above, the discharger shall notify the RWQCB Executive Officer, the State Department of Health Services - Division of Drinking Water and Environmental Management, and the Department of Toxic

Substances Control within 24-hours. The thickness of any NAPL layer observed in ground water monitoring wells shall be recorded and reported as part of the quarterly ground water reporting program.

5. Prior to sampling the wells, the discharger shall measure and record the depth to static water level in each well. The discharger shall report the depth to static ground water, elevation of static ground water, depth to and elevation of the top of the screened interval and the elevation of the top of casing shall be tabulated and reported for each well included in the monitoring program.

6. Ground water monitoring wells shall be sampled in accordance with commonly accepted, standard practices. Prior to sampling the wells, the water standing in the casing shall be pumped using an appropriate purging methodology which will minimize aeration of the water samples and the destruction of volatile and organic contaminants. The volume of water to be purged shall be either: a) at least three to five well volumes (including the gravel pack volume) or b) until the water chemistry stabilizes with respect to pH and specific conductance. Water chemistry can be considered stable when in-line specific conductance and pH readings are within 10% and 0.1 pH units respectively over 2 successive well bore volumes. Water samples shall be obtained that are representative of the fresh aquifer formation water. Provide the calculations of wellbore volumes and volumes of water purged from each well, if purging is performed using option a) above.

7. After purging, a representative water sample should be collected when the water level reaches 80% of the static water level. If 80% recovery of the initial water level exceeds two hours, a sample should be collected as soon as the water level is sufficient to recover a representative sample.

REPORTING REQUIREMENTS

8. A letter of transmittal shall accompany each ground water monitoring report submitted in compliance with Directive No. 1 of this Order. The letter should discuss the essential points in each monitoring report. The transmittal letter shall discuss any significant findings, violation(s) of requirements found during the monitoring period and actions taken or planned for correcting the violation(s). If the discharger has previously submitted a detailed time schedule for correcting violation(s) a reference to the correspondence transmitting such schedule will suffice. If no violations have occurred in the last monitoring period, it shall be stated in the letter of transmittal. Monitoring reports shall be signed by the preparer of the report and an appropriately registered professional (registered geologist or registered civil engineer) in the State of California. The letter of transmittal shall be signed by the Commanding General at MCB Camp

Pendleton, or his duly authorized representative.

9. The Reports prepared to satisfy Ground Water Monitoring Requirements of Directive No. 1 of this Order must include the following minimum information:

a) Report of the historical observations of the measured depths to free petroleum product (NAPL) and ground water in each well at the MCAS fuel farm facility *and* in each early warning well. Provide a narrative description of the method(s) used to make the required measurements. For each well, tabulate data on depth to free petroleum product (NAPL), NAPL thickness, depth to ground water, top of casing elevations, depths to the top of well screens and total depth for each well included in the monitoring program.

b) Provide ground water elevation contour maps for the MCAS Facility with the ground water flow direction and calculated hydraulic gradient(s) clearly indicated on the figure(s). Prepare separate ground water contour maps for each aquifer identified beneath at the facility. Indicate clearly on the diagrams whether the base water supply wells identified in Finding No. 8 of this Order are in on- or off-line when the monitoring wells are gauged.

c) Provide a site plot plan which clearly illustrates the locations of monitoring wells, above ground tanks, former/current underground storage tank systems (and product piping), buildings and base water supply wells located within a 3,000 ft radius of the MCAS fuel farm site.

d) For each ground water monitoring well, provide a tabulation of the following information: elevation of wellhead; thickness of free petroleum product (if present); depth and elevation of static ground water level; depth and elevation of the top of the well screen; screened interval of each well and total depth of the well.

e) For each of the base water supply wells identified in Finding No. 8 of this Order, provide a tabulation of the following information: elevation of wellhead; depth and elevation of last measured depth to static ground water; depth and elevation of top of well screen; screened interval(s) of each well and total depth of the well.

f) A detailed description of sample collection protocol (e.g., well purging, sample collection equipment, sample preservation and shipment procedures and decontamination procedures). Clearly describe any significant changes in sampling protocol or equipment between sampling

events.

g) Analyze ground water samples from: 1) all ground water monitoring wells, which do *not* contain observed free petroleum product and 2) each of the base water supply wells identified in Finding No. 8 of this Order for the following contaminants using the specified laboratory test methods:

Constituent	EPA Test Method
Total Petroleum Hydrocarbons	TPH-DHS Method or EPA Method 8015
Volatile Aromatic Hydrocarbons	EPA Method 8240 for *only the first round ground-water sample from each well*; EPA Method 8020 for all subsequent rounds of ground-water samples.
Naphthalene	EPA Method 8270 *only for the first round ground-water sample from each well;* EPA Method 8310 annually for subsequent rounds of ground-water samples.
Total Lead	Analyze *the first round of ground-water sample from each well;* then determine need for additional samples, if necessary.

h) Provide a complete historical tabulation of ground water monitoring data for each of the constituents listed above from each ground water monitoring well and include available ground water sample results from water production wells identified in Finding No. 8 of this Order.

i) Provide copies of laboratory data sheets, laboratory QA/QC information and chain-of-custody documents for the most recent round of ground water samples with each report.

j) Provide a narrative description of the current site conditions and a brief summary of known site hydrogeological conditions.

k) Provide a narrative description of current ground water production activity from the three base water production wells identified in Finding No. 8 of this Order.

l) Provide an up to date evaluation of historical trends and changes in ground water monitoring data with each report. The analysis of trends in contaminant concentrations shall be based upon the ground water data historically collected at the site. Graphs utilized for this purpose shall be of an appropriate scale to clearly illustrate trends in the ground water data. The analysis of trends in contaminant concentrations is to be performed on an annual basis and shall be included in the final regular ground water monitoring report for each calendar year.

m) Provide technical interpretations of the ground water data, conclusions and recommendations for future action with each report.

n) Provide a narrative description of how purge water from ground water wells and/or soil cuttings are managed at the site. Provide documentation (e.g., manifests/receipts) of proper disposal of contaminated well (purge) water and/or soil cuttings removed from the site.

o) Each report must be reviewed and signed by an appropriately registered professional as required under Sections 6735, 7835 and 7835.1 of the California Business and Professions Code.

10. The discharger shall submit the ground water monitoring reports to the RWQCB Executive Officer in accordance with the following schedule:

REPORT	REPORT PERIOD	DUE DATE
Quarterly	January, February, March April, May June July, August, September October, November, December	April 30 July 31 October 30 January 30
Annual	January - December	January 30

The first quarterly ground water monitoring report is due by **July 31, 1995.**

11. The discharger shall take interim remedial actions, as necessary, to abate or correct the effects of the discharge. Interim remedial actions may occur concurrently with any other phase of corrective action. The discharger shall submit a work plan by **October 31, 1995** describing the interim remedial action(s), the schedule for implementation of those actions and reporting the results of the interim remedial action(s) at the site.

12. Interim remedial action(s) selected by the discharger shall be consistent with the requirements of CCR Title 23, Chapter 16, Article 11, Section 2722(b). At a minimum, the interim remedial action must include the removal of free petroleum product in compliance with the requirements of CCR Title 23, Chapter 16, Article 5, Section 2655. The discharger may also submit proposals for additional appropriate interim remedial action(s) for consideration by the RWQCB Executive Officer at a later date.

13. The discharger shall complete a preliminary site assessment in compliance with CCR Title 23, Chapter 16, Article 11, Section 2723. The preliminary site assessment report may be included as part of the comprehensive soil and ground water investigation report required under Directive No. 14 of this Order.

14. The discharger shall complete a soil and ground water investigation in compliance with CCR Title 23, Chapter 16, Article 11, Section 2725. This site investigation shall delineate the vertical and horizontal extent of soil and ground water contamination in shallow and deep aquifers in the vicinity of the MCAS Fuel Farm facility. The site investigation shall be performed in compliance with the requirements of SWRCB Resolution No. 92-49 (as Amended April 1994) "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304." The completion of an adequate site investigation is often an iterative process of performing field work and reporting results to the regulatory agencies for review. The discharger shall submit the work plan to the RWQCB Executive Officer for each iterative phase of this process as necessary to complete the site investigation to the satisfaction of the RWQCB Executive Officer. A work plan for the site investigation shall be submitted to the Executive Officer by **January 30, 1996** for review and comment. A comprehensive site investigation report shall be submitted to the RWQCB Executive Officer no later than **August 30, 1996**.

15. The discharger shall perform a *"capture zone analysis"* for each of the three base water supply wells identified in Finding Number 8 of this Order. The capture zone analysis should be performed for minimum simulation times of 10

and 20 years. The capture zone analysis shall result in a report which includes an evaluation of:

a) all existing geological and site investigation data from known contaminated sites within 3,000 feet of the site;

b) all existing hydrogeological information from the various environmental and ground water programs implemented at the base and available ground water modeling information for the Chappo basin (22 and 23 Areas) of the Santa Margarita River;

c) the potential vertical and horizontal contaminant migration pathways from the fuel farm area of the MCAS Facility to each of the base water supply wells;

d) comparison of capture zones estimated during the capture zone analysis with the observed radius of influence measurements from pumping tests performed at the MCAS facility on wells installed for the I.R. Program, or new aquifer tests designed to evaluate the radii of influence for base water supply wells identified in Finding No. 8 of this Order;

e) effects of the minimum, average and maximum pumping rates on the capture zone from each base water supply well; and

f) effects of the minimum, average and maximum pumping rates with all three of the base water supply wells (identified in Finding Number 8 of this Order) operating concurrently.

The aquifer characteristics used as input parameters for the capture zone analysis should be based upon site specific data. If appropriate existing data are available, the discharger shall provide a narrative justification for the use of these data, a tabulation of the specific data used in the analysis and provide reference information for the original document(s) which are the source(s) of the aquifer data used by MCB Camp Pendleton. The discharger shall prepare and submit a work plan for performing the capture zone analysis for review and comment by the RWQCB staff. The work plan for the capture zone analysis shall be submitted to the Executive Officer no later than **April 20, 1996.**

16. The results of the capture zone analysis performed under Directive No. 15 of this Order shall be plotted as overlays on a map of the MCAS Facility. The map of the MCAS Facility shall also illustrate the locations of all known operating and former USTs at the MCAS Facility and known contaminated sites

under the Installation Restoration (I.R.) Program. The sites identified on the map shall also be tabulated in the capture zone analysis report by building number and facility/site name, and include a brief description of the hazardous material(s) released or stored at the facility. A comprehensive capture zone analysis report with capture zone maps (as described above) shall be submitted to the RWQCB Executive Officer by **October 10, 1996**.

17. MCB Camp Pendleton shall use the information generated by the well capture zone analysis to identify appropriate wellhead protection areas, as defined by the U.S. Environmental Protection Agency, for the wells identified in Finding Number 8 of this Order and develop a plan for establishment of wellhead protection areas for the MCAS Facility. A proposed long-term, management plan for the wellhead protection areas at the MCAS Facility shall be included in the Corrective Action Plan to be submitted under Directive No. 19 (below).

18. Before taking action on Directive Numbers 1, 11, 14, 15, or 24 the discharger shall submit a work plan describing the details of the proposed actions and a proposed schedule for the completion of the work. The discharger shall modify the proposed work plan(s) as directed by the RWQCB Executive Officer.

CORRECTIVE ACTION PLAN

19. The discharger shall submit a comprehensive Corrective Action Plan (CAP) to the RWQCB Executive Officer no later than **January 30, 1997.** The information presented in the CAP must be consistent with the requirements of CCR Title 23, Division 3, Chapter 15, Article 11 and include the elements listed below:

    a) An assessment of impacts listed in Directive No. 20 of this Order; and

    b) A feasibility study containing the information listed in Directive No. 21 (below) of this Order.

20. The report on the assessment of impacts required in Directive No. 19a of this Order shall contain the following minimum information:

    a) Ground Water Impact Assessment

        1) The physical and chemical characteristics of the substance discharged, including its toxicity, persistence, mobility and potential for migration in water, soil and air.

2) The results of a complete soil and water investigation which includes analysis of data necessary to assess the nature, vertical and horizontal extent of the discharge. Determine the spatial distribution of and concentrations of each constituent of concern throughout the zone affected by the release.

3) The hydrogeological characteristics of the site and surrounding area where the discharge has migrated or may migrate. This should include an evaluation of the potential impact to surface water resources by waste constituents.

4) The proximity and quality of nearby ground water and the current and potential beneficial uses of these waters. The results of the ground water user survey including a map of locations of all base water production wells located within one mile radius of the MCAS Facility at MCB Camp Pendleton. A narrative description and graphical representation of the known well construction details, estimated hydrogeologic accessibility by contaminants and an evaluation of the vulnerability of all base water supply wells identified on the well location map required above.

5) Maps of the flow direction(s) and gradient(s) of ground water in the shallow and deep water bearing zones beneath the MCAS Facility under the following conditions:

   i) ambient ground water flow conditions, and

   ii) during the operation of the base water production wells.

6) The existing quality of ground water, including other known sources of contamination or pollution and their cumulative impact on ground water quality.

7) Include an evaluation of the results from the capture zone analysis required in Directives No. 15 and 16 (above) and propose a wellhead protection area plan for the MCAS Facility as required in Directive No. 17 (above) of this Order.

8) The potential for health affects caused by human exposure to waste constituents.

9) The persistence and permanence of the adverse effects.

b) Surface Water Impact Assessment

1) The physical and chemical characteristics of the substance discharged, including its toxicity, persistence and potential for migration in water, soil and air.

2) The results of a soil and water investigation, including the collection and analysis of data necessary to assess the nature, vertical and horizontal extent of the discharge. Determine the spatial distribution of and concentration of each constituent of concern throughout the zone affected by the release;

3) The hydrogeological characteristics of the site and surrounding area where the discharge has migrated or may migrate.

4) The flow direction and gradient of ground water in proximity to surface water resources adjacent to the MCAS Facility.

5) The patterns of precipitation in the region.

6) The existence and orientation of known natural and manmade surface and subsurface drainage systems at the site.

7) The existing quality of surface water, including other sources of contamination or pollution and their cumulative impact on ground water quality.

8) The potential for health affects caused by human exposure to waste constituents.

9) The potential damage to wildlife, crops, vegetation and physical structures caused by exposure to waste constituents.

10) The persistence and permanence of the adverse effects.

21. The feasibility study required in Directive 19b of this Order shall contain an evaluation of alternatives for cleanup of soil and ground water. The evaluation shall be consistent with the requirements of CCR Title 23, Chapter 16, Section 2726(f) and include the following elements:

a) An evaluation of the effectiveness, feasibility and cost of at least two alternatives to attain background ground water quality for the following constituents:

Corrected Pb MCL

Constituents
Total Petroleum Hydrocarbons
Benzene
Toluene
Total Xylenes
Ethylbenzene
Total Lead

b) An evaluation of the effectiveness, feasibility and cost of at least two alternatives to attain the following primary MCL water quality levels:

Constituents	Primary MCL (ug/L)
Benzene	1
Ethylbenzene	680
Toluene	150
Total Xylenes	1,750
Total Lead	50

c) An evaluation of the effectiveness, feasibility and cost of at least two alternatives to attain the following secondary MCL water quality levels:

Constituents	Secondary MCL (ug/L)
Total Petroleum Hydrocarbons	5
Benzene	1
Ethylbenzene	29
Toluene	42
Total Xylenes	17

d) An evaluation of methods to control the spread of the free product and dissolved contaminant plume while the base water supply wells, identified in Finding Number 8 of this Order, are in operation.

e) A comprehensive description of the cleanup and abatement activities associated with each recommended alternative.

f) A proposed time schedule, including interim milestone dates, for completion of each recommended alternative.

g) A recommended cleanup alternative for each cleanup level and a commitment to implement the recommended alternative.

22. Based upon review of the Corrective Action Plan, the RWQCB Executive Officer may amend this cleanup and abatement order to identify the target ground water and soil cleanup levels to be attained at the site. If this Order is not amended by the RWQCB Executive Officer, then:

a) The water quality protection standards (maximum contaminant levels) identified in Finding 17(a) of this Order will be adopted as the maximum ground water contaminant concentration levels allowed for the site.

b) Residual fuel contaminant concentrations in soils at the site must be low enough so that leachable contaminants will not degrade water quality at the site. The discharger shall propose to the RWQCB Executive Officer a range of site specific soil cleanup levels based upon an evaluation of from contaminant leachability tests from an adequate number of significantly contaminated soils samples collected from the site. The proposed soil cleanup levels must comply with the water quality protection requirements of CCR Title 23, Article 11; CCR Title 23, Chapter 15; SWRCB Resolution 88-63; SWRCB Resolution No. 68-16 and the RWQCB Basin Plan.

The discharger shall implement the Corrective Action Plan in accordance with a time schedule proposed by the discharger and approved by the Executive Officer. The discharger shall modify the proposed Corrective Action Plan as required by the RWQCB Executive Officer.

23. The discharger shall provide the RWQCB Executive Officer with regular, periodic written evaluations of the effectiveness of the selected corrective action alternative. The exact method(s) of evaluation and schedule of these written reports shall be proposed to the Executive Officer by the discharger in the Corrective Action Plan (CAP) required by Directive 19 of this Order.

MONITORING AND VERIFICATION OF CORRECTIVE ACTIONS

24. After implementation of the Corrective Action Plan is completed as required under Directive No. 19 of this Order, the discharger shall submit a work plan for the "Verification Soil Sampling and Ground Water Monitoring" to the RWQCB Executive Officer for review and comment. This work plan is due no later than **four months** after the implementation of the Corrective Action Plan has ceased.

25. The RWQCB Executive Officer will review the information provided by the discharger concerning the effectiveness of the remedial alternative, and the results of the "Verification Soil Sampling and Ground Water Monitoring" phase of corrective action. Based upon the result of the Corrective Action Plan implemented as required in Directive No. 19 of this Order and in compliance with CCR Title 23, Chapter 16, Article 11, Section 2728(d), the RWQCB Executive Officer may amend this cleanup and abatement order to identify the final soil and ground water cleanup levels to be obtained at the site.

NOTIFICATIONS

26. Before implementation of the remediation alternative begins, the discharger shall:

    a) notify the RWQCB Executive Officer and in writing, by registered mail, of its intention to begin cleanup in accordance with the approved Corrective Action Plan alternative;

    b) Comply with any conditions set by the RWQCB Executive Officer, including mitigation of any adverse consequences from site remediation activities; and

    The discharger shall modify or suspend cleanup activities when directed to do so by the RWQCB Executive Officer.

27. The dischargers must notify the RWQCB Executive Officer by telephone or facsimile within 24-hours of any emergency conditions created by the discharge of wastes to land or water resources as a result of corrective actions taken at this site. The initial notification must be followed by a detailed written description of the discharge, an explanation of the conditions which lead to the discharge of wastes and the emergency remedial actions taken to mitigate the effects of the discharge. The written notification shall be sent to the RWQCB Executive Officer by registered mail.

28. The discharger shall provide copies of all reports and work plans required by the Directives of this Order to the San Diego County Department of Environmental Health (Site Assessment and Mitigation Division) for review and comment.

PROHIBITIONS

29. The discharger shall properly manage, treat and/or dispose of contaminated soils and ground water in accordance with applicable federal, state and local

regulations.

30. Neither the treatment nor the discharge of wastes shall create a pollution or a nuisance as defined in Section 13050, Division 7 of the California Water Code.

31. The discharge of any low volume non-hazardous wastes or waste constituents which are generated as a result of corrective action at this site is prohibited unless the discharge is permitted under the National Pollutant Discharge Elimination System (NPDES) or by issuance of Waste Discharge Requirements by the RWQCB under Section 13260 of the California Water Code.

REIMBURSEMENT OF REGULATORY OVERSIGHT COSTS

32. If the discharger is able to demonstrate satisfactory compliance the ground water and soil cleanup levels specified in Directive 22 through the implementation of interim remedial action(s) at the site, the RWQCB Executive Officer may recommend rescission of the remaining Directives of this cleanup and abatement Order to the RWQCB.

33. Pursuant to Section 13304 of the Water Code, the discharger is hereby notified that the RWQCB is entitled to, and may, seek reimbursement for all reasonable costs actually incurred by the RWQCB staff to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement or the effects thereof, or other remedial action required by this cleanup and abatement order. Reimbursable costs may include costs incurred by the RWQCB following **March 1, 1995.** Upon receipt of a billing statement for such costs, the discharger shall reimburse the RWQCB.

34. Failure to submit technical reports required under this cleanup and abatement order may result in the imposition of civil liabilities, under the California Water Code Section 13350(d), in an amount not to exceed fifteen thousand dollars ($15,000) for each day in which the violation occurs.

ARTHUR L. COE
Executive Officer

Date issued: March 16, 1995

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

ADDENDUM NO. 1 TO

CLEANUP AND ABATEMENT ORDER NO. 95-09

U.S. MARINE CORPS AIR STATION FUEL FARM,
23 AREA, U.S. MARINE CORPS BASE
CAMP PENDLETON, CALIFORNIA
SAN DIEGO COUNTY

The California Regional Water Quality Control Board, San Diego Region (hereinafter RWQCB) finds that:

1 On July 1,1997, the RWQCB Executive Officer issued a letter to the discharger indicating agency concurrence with implementation of the preferred remedial alternative identified by the discharger in the revised CAP dated April 4,1997.

2. In a letter dated June 9, 1998, the RWQCB Executive Officer requested that the discharger indicate by written correspondence: a) a schedule for implementation of the corrective action plan for this site, and b) an estimated date when the corrective action will be completed for this site.

3. By letter dated July 13, 1998, the U.S. Marine Corps indicated to the RWQCB that: a) field work to implement the corrective action plan is anticipated to commence in the Fall of 1999, and b) the estimated time to meet cleanup goals for ground water (maximum contaminant levels or MCLs) is seven years, by the end of calendar year 2006.

4. This enforcement action is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000 et seq.) in accordance with Section 15321, Chapter 3, Title 14, California Code of Regulations.

IT **IS HEREBY ORDERED,** that pursuant to Section 13304 of the California Water Code, the U.S. Marine Corps (the "*discharger*") shall comply with the following Directives:

1. The discharger shall implement a quarterly groundwater monitoring program with annual reporting of results to the RWQCB. The ground water monitoring program must include at a minimum:

a) all wells designated/installed to serve as *"early warning wells"* (FL-01, FL-02, FL-03, FL-04, FL-05, FL-06 and FL-07) located near base water supply wells (#2363, #2373 and #2393) at the U.S. Marine Corps Air Station Facility; and

b) ground water monitoring wells located at the downgradient perimeter of the fuel farm facility.

Specific ground water monitoring well locations at the perimeter of the MCAS Fuel Farm to be included in the ground water monitoring program were previously proposed by the discharger in writing to the RWQCB for review and concurrence. The RWQCB will also consider future proposals from the discharger for the inclusion of additional appropriately located existing ground water monitoring wells which may have been installed at the MCAS facility as a result of other environmental investigations (*e.g.*, the Installation Restoration Program).

GROUND WATER MONITORING

2. Ground water sampling protocols and reporting format shall continue to comply with the existing Directives of CAO 95-09. The discharger may propose an alternative groundwater sampling protocol to the RWQCB. The discharger shall notify the RWQCB Executive Officer by telephone and facsimile within 24-hours of detecting any petroleum constituents in groundwater samples collected from the "*early warning wells*" identified in Directive No. 1(a) above.

IMPLEMENTATION OF CORRECTIVE ACTIONS

3. The discharger shall implement the corrective action plan dated April 4, 1997 submitted in compliance with Directive No. 19 of CAO No. 95-09 by **December 31, 1999.** Corrective actions to ensure compliance with water quality objectives shall be completed by **December 31, 2006.**

MONITORING AND VERIFICATION OF CORRECTIVE ACTIONS

4. After implementation of the Corrective Action Plan (required by Directive No. 19 of this Order) is completed, the discharger shall submit a work plan for the "Verification Soil Sampling and Ground Water Monitoring" to the RWQCB. This work plan is due no later than **March 30, 2006**.

5. During the implementation of active remediation, the discharger shall submit the quarterly ground water monitoring results in annual reports to the RWQCB in accordance with the following schedule:

FREQUENCY	REPORT PERIOD	DUE DATE
Annual Report of Quarterly results	January - December	January 30

The first annual ground water monitoring report is due by **January 30, 2000.**

6. The discharger shall take interim remedial actions as necessary to abate or correct the effects of the discharge. Interim remedial actions may occur concurrently with any other phase of corrective action. The discharger shall provide work plans describing proposed interim remedial actions, a schedule of implementation of interim remedial actions, and the reporting of results from the interim remedial action to the RWQCB.

7. Directive No. 1 of Cleanup and Abatement Order No. 95-09 is hereby replaced by Directive No. 1 of this addendum.

8. Directive No. 24 of Cleanup and Abatement Order No. 95-09 is hereby replaced by Directive No. 4 of this addendum.

9. Directive No. 10 of Cleanup and Abatement Order No. 95-09 is hereby replaced by Directive No. 5 of this addendum.

10. Directive No. 11 of Cleanup and Abatement Order No. 95-09 is hereby replaced by Directive No. 6 of this addendum.

Ordered by:

JOHN H. ROBERTUS
Executive Officer

Date: March 30, 1999
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ADDENDUM NO. 1 TO
CLEANUP AND ABATEMENT ORDER NO. 95-09

U.S. MARINE CORPS AIR STATION FUEL FARM,
23 AREA, U.S. MARINE CORPS BASE
CAMP PENDLETON, CALIFORNIA
SAN DIEGO COUNTY

TABLE 1: SCHEDULE OF COMPLIANCE FOR DIRECTIVES IN ADDENDUM NO. 1 TO RWQCB CLEANUP AND ABATEMENT ORDER No. 95-09

DIRECTIVE	SUBMITTAL	DUE DATE
1 & 5	Annual reporting of quarterly groundwater monitoring results per Directive Nos. 1 & 5 of this addendum.	**January 30, 2000**
3	Implement corrective actions per CAP dated April 4, 1997.	**December 31, 1999**
3	Complete remediation to comply with water quality objectives for the site.	**December 31, 2006**
4	Submit a work plan for verification sampling and monitoring to the RWQCB.	**March 30, 2006**